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DCS-1062
Copy 8 of 8

21 November 1960

MEMORANDUM FOR : Chief, Development Branch, DPD-OD/P

SUBJECT : Trip Report on CORONA Program at Boston

1. PURPOSE:

Design Review of C⁴ and C⁴⁺¹.

2. ATTENDEES:

25X1 [redacted] J. Wolfe, 25X1

3. DESIGN REVIEW OF C⁴:

a. Post-Series #1062 - LMSD presented an analysis to date on the findings of the instrument performance and probable causes of malfunction. From 1' to 37' showed many markings, nicks, in the material, etc. From 38' to 43' (except at 41½' tear of leader observed at outer edge) showed better leader tracking. No actual payload was transported. The material was ripped or cut or torn at 183'. This discussion coincided with the findings of [redacted] and clearly indicates instrument failure rather than material failure, although a polyester leader may have pulled the item out of its problem. It was learned at the end of the meeting that the post-carrier at LMSD had arrived at the following conclusions: 25X1

(1) The leader will be removed from operational payloads. A test will be conducted to determine if "wet" will result from the raw material being in the film path during ascent.

(2) The moisture package will be reduced so that danger from excessive humidity or actual water droplets accumulating on the film will decrease. A damp film is a potential cause for sticking emulsion and/or pelloid.

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(3) The tension on the supply spool will be maintained during the initial orientation phase of the moon coma into orbit.

b. Acceptance Review of 'C' Instrument

(1) Instrument #15 - Noticed that rollers not parallel to each other. Also, [redacted] claims that system was not properly adjusted before going to HAT3. This was due principally to the new supply tension system. Admittedly there were some areas which required some time because this being the first replacement of the pack system, many adjustments were required to establish the correct tension for proper tracking. These adjustments were made and all hands are satisfied that the proper tension was present. In addition, there was a mean-brake failure. It is considered to be poor quality control. 25X1

(2) Instrument #16 - Definitely poor quality control. Boston has demanded that New York increase their efficiency. (Structural failure)

(3) Instrument #17 - Dropped in New York and later disassembled and retrofitted. After reassembly was subjected to higher levels of environmental tests - vibration and shocks. (All three axes) It was agreed by Boston people and [redacted] that, after going thru complete acceptance tests, the unit was favorably operational. However, there was a remote possibility that the shock tests could have amplified non-visable hairline cracks in the plate. There were two (2) mal-functions during HAT3 test. These were mis-scanning due to misadjustment of the supply tension. Later adjustments corrected this and the last test was satisfactory. 25X1

(4) Instrument #18 - Has rough operation. It appears to be G&C. problem.

(5) Instrument #19 - Failure in HAT3 test - shuttle tape off of guides. This was concluded to be due to faulty operation of LDR switch. Shuttle spring was replaced and adjusted. The shuttle spring shaft was scored and the shaft replaced. Operation satisfactory.

This instrument is at VAFB and is scheduled for the next mission. The question arises as to whether this instrument is well "run-in" (since it has a large number of cycles) or about "worn-out" and needs refurbishing. New components, of course, require "run-in" time which increases cycles on items not replaced. With so little history on this subject, it is difficult to resolve. Mr. Kiefer has recommended LMSC submit a confidence paper on #19 and that [redacted] be called in to review same.

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(6) Instrument #20 - On receipt of the unit at LMSC, it indicated a presence of foreign matter. It was recommended that closer observance be made in this area.

(7) Instrument #21 - Brake Problem - The problem is being evaluated by the manufacturer and New York. Modifications have been made and tests in progress both at New York and the manufacturer denote that the brake is functioning favorably.

c. Quality Assurance - Action Items:

(1) Analyze specifications and processing for adequacy.

(2) Revise specifications and processing as required.

(3) Analyze inspection methods for adequacy and possible improvement.

(4) Analyze check-out specifications and processing.

d. Unit 1103 Recommendation: Study the following:

(1) Is the shuttle design adequate?

(2) What is the most probable cause of 1062 failure and what is the probability of repetition?

(3) Does available telemetry data and film indicate instrument is operating normally?

(4) Is it agreed that items following BAT3 Number 2 are adequate?

(5) Could reorientation maneuver cause a loose loop?

e. Boston Recommendation: They suggest a policy that whenever a fault occurs to stop and establish the source of the fault before proceeding.

(1) Recommend the monitoring of motor armature I.

(2) Recommend not using Acetate for leader. In place of this use polyester or no leader at all.

f. General Recommendations:

(1) Recommend that a review be made of the design changes in the suspect areas to determine if some condition may exist to cause above noted failures.

(2) It was mutually agreed that the analyses of the problem areas in the CF instruments are similar in nature but they are not the same.

(3) The quality assurance action items as noted above will be executed immediately.

g. Specific Recommendations:

(1) Supply torque motor be energized during ascent and reorientation (1103 and up).

(2) Monitor armature current in all phases of checkout.

(3) Uniform CSM equipment. Action item for [redacted] Resolution to be made by December 1. 25X1

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(4) Removal of Acetate leader and replace with polyester material, which is non-humidity sensitive. (Action of November 18 meeting at LMSD evidently resolved this item - no leader!) However, Eastman-

Kodak can supply clear (no black) polyester leader.

(5) Investigate ultra-sonic splicing for operational payload immediately. I have since checked this item with [redacted] and Eastman-Kodak is investigating this process. 25X1

(6) Investigate scan limit switch setting as a function of V/H programmer. Reestablish new static V/H settings in acceptance test and checkout programs. (In progress at the present time).

b. Go/No Go Recommendations - 1103:

(1) Boston recommends that #1103 fly insofar as it relates to the failures of 1062. It is considered that the failure in #17 (1062) has no bearing on #19 (1103).

(2) Boston recommends that 1103 not fly until the brake problem confronting Instrument #21 be resolved and fixes made on #19 as well as #21.

(3) I placed a requirement on LMSD to inform Headquarters by message (as a part of [redacted] weekly progress report) a personal history/confidence statement on any instrument scheduled to fly within the next week. 25X1

4. BOSTON REVIEW OF [illegible].

a. Lens Status:

(1) Lens #1 done (except coating).

(2) Lens #2 - 2 blanks missing, now replaced. Due to be finished 18 December 1960.

(3) Lens #3-9 - Some glass due 20 November 1960. Balance due 9 December 1960.

(4) Lenses #3 thru #7 - [redacted] delivery: 25X1
First item three months after receipt of glass. Thereafter, one per month.

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(5) Testing of prototype lens showed 500 lines per millimeter on the bench in spite of hurried assembly and one outsized element.

b. Telemetry: The following are the instrumentation requirements:

(1) 16 sensor outputs.

(2) 2 light leak detectors.

(3) 2 commutators - (1) input to camera and (2) output of camera.

(4) Film footage (cassette) 2 channels.

(5) Cassette torque motor voltages.

(6) ± 28 v calibrate (Ref. voltage).

(7) Clock reset calibrate.

(8) Clock - 2 channels - 0.1 sec. and 3.2 sec.

(9) Input to system - F/B steps and clock reset.

c. Clock Philosophy: The following discussion was held on the Boston proposed clock system:

(1) Clock system presently in engineering prototype stage and has been proven that time resolution can be made at 100 milliseconds with a 2.5 millisecond accuracy.

(2) TLM of readout - There is definite capability of providing 23 bits of clock readout to ground the question raised, how many do we want? LMSD will investigate this problem.

(3) Optical - There is not available an optical simulator to test out a f3.5 lens. At present there are three simulators for f5 lens. Due to the time element, the simulator can be modified at or after the release of the last shipment. There is a requirement to modify all three f5 simulators to f3.5 to take care of Boston, LMSD and VAFB.

(4) Test and checkout consoles

(a) There is a requirement for a minimum of three consoles for the C***.

(b) The basic design is not completed. [redacted] will submit this sketch when completed. The present dimensions of the structure and component included are: 72" high by 38" wide by 24" deep. Components: +28V and - 28V supplies, 400 cycles supply, 24 channel visecorder patch panel for TLM, switch panel - spare terminal boards, spare cubicles for expansion. The question of a scope was raised and LMSD stated that Boston would be advised.

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c. Vehicle simulated power supply consoles:

(1) Boston was advised by LMSD that a vehicle simulated power supply would be furnished them for use in performing several systems runs during acceptance.

(2) A duplicate copy of the fairing harness will be provided to Boston by LMSD for the test and checkout operations.

d. The primary Itek engineers for these equipments have been working as "white side" only awaiting clearances. It is obvious that much time could be saved and many potential and immediate problems avoided if we could expedite clearance of these men so they could visit the [redacted] and discuss interface problems as actual conditions. These men are:

NRO
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(1) [redacted]

(2)

5. GENERAL:

a. Mr. Wolfe briefed me on Itek's production control plans for C***. A special control room has been established and integrated with contracting, logistics and engineering personnel in adjacent areas. The procedures are realistic. With the early warning capability to identify problem areas, they should meet

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their schedules with the minimum of difficulty.

h. I saw the C*** experimental model operate without film. It is a comparatively clean, uncomplicated design and should prove to be a great improvement in quality and reliability. Although film has been metered through a mock-up path, actual film is just now being introduced to the experimental unit. A minor problem exists in the sequence timer cam design for the integration of the revolving lens to the stove pipe cone. All engineering drawings for the prototype are expected to be released before 1 December 1960.

SIGNED

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25X1 DPD/DB/[redacted]

Distribution:

1&2-C/DB/DPD
3-C/TAS/DPD
4-C/CPS/DPD
25X1 5-PIC [redacted]
6-C/SU/DPD
7-DPD/DB
8-DPD/RI

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